



RANDBEDINGUNGEN FÜR EIN DEMOKRATISCHES UND NACHHALTIGES STROMSYSTEM

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Energy Economics Group,
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- 1. Einleitung: Motivation**
- 2. Variable erneuerbare und das Stromsystem**
- 3. Preise in Day-ahead- Strommärkten**
- 4. Die Bedeutung von Flexibilitäten**
- 5. Prosumers und Energiegemeinschaften**
- 6. Re-Design des Strommarktes**
- 7. Schlußfolgerungen**

Motivation:

- * Ziel EU: RED II : 42.5 % Erneuerbare:
- * Es ist nicht möglich, die variablen EE in das System hinein zu pressen
- * Immer mehr Menschen wollen einen Beitrag zur eigenen Stromversorgung leisten
- * Versorgungssicherheit

Commission welcomes deal on X

https://ec.europa.eu/commission/presscorner/detail/en/ip_23_6602

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PRESS RELEASE | 14 December 2023 | Brussels

Commission welcomes deal on electricity market reform

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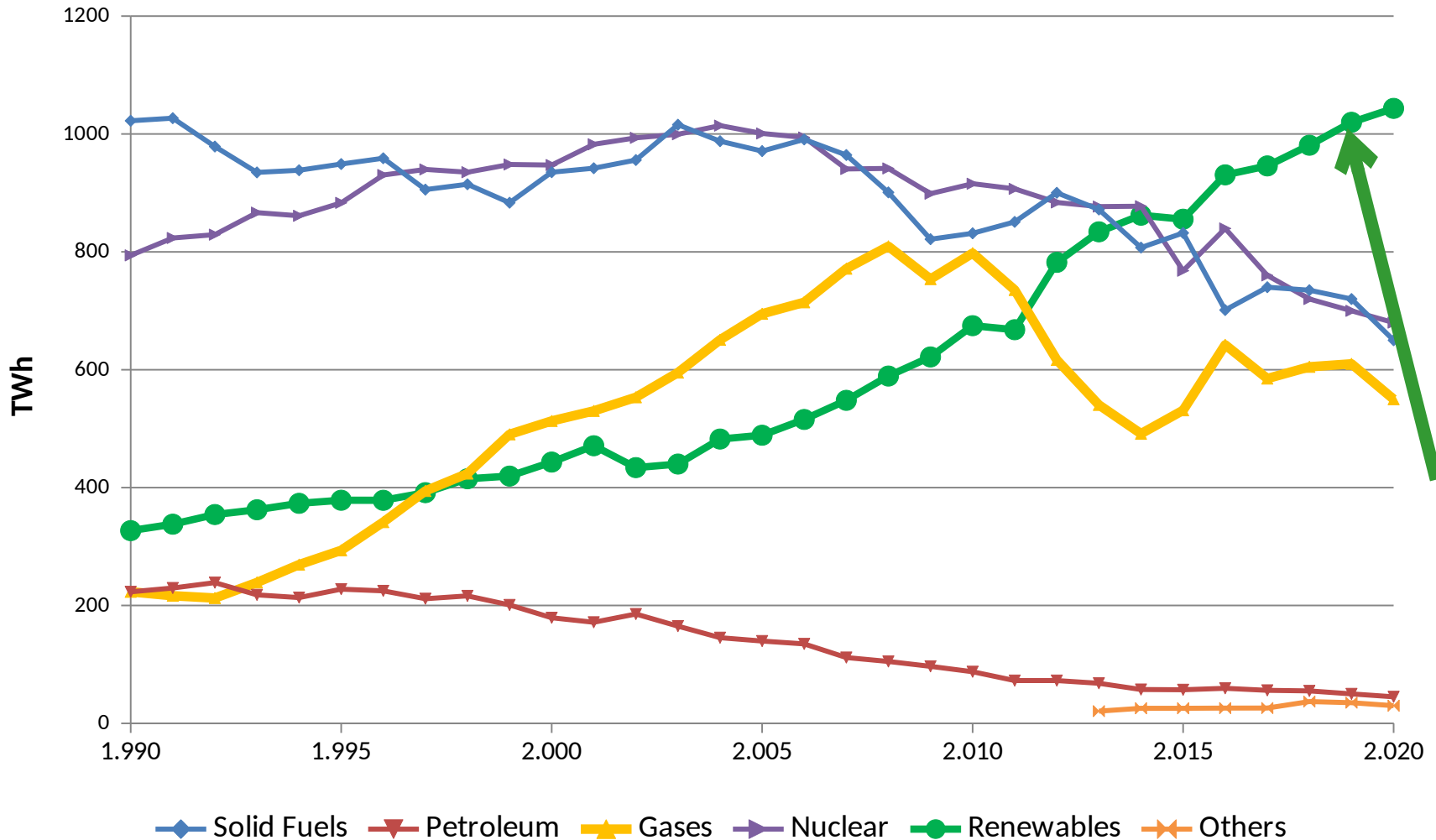
The Commission welcomes the provisional agreement reached today by the European Parliament and Council on the **reform of the EU's electricity market design**. This deal will help the EU build a **renewables-based energy system**, **lower energy bills** and **better protect consumers** from price spikes and empower them to benefit from the transition. It will ensure a **sustainable and independent energy supply** to the EU, in line with the [European Green Deal](#) and the [REPowerEU Plan](#). This reform, which was proposed by the Commission as part of the [Green Deal Industrial Plan](#), will also make the **European industry cleaner and more competitive** thanks to better access to affordable renewable, non-fossil energy.

The reform provisionally agreed today by the EU co-legislators features revisions to several pieces of EU legislation— notably the Electricity Regulation, the Electricity Directive, and the REMIT Regulation. Building on the lessons of the energy crisis spurred by Russia's invasion of Ukraine, the agreed reform will bring **more price stability** to both consumers and suppliers thanks to a broader use of **long-term contracts for clean power production** and will bring more **non-fossil flexible solutions** into the system such as demand response and storage.

Better protected and empowered consumers

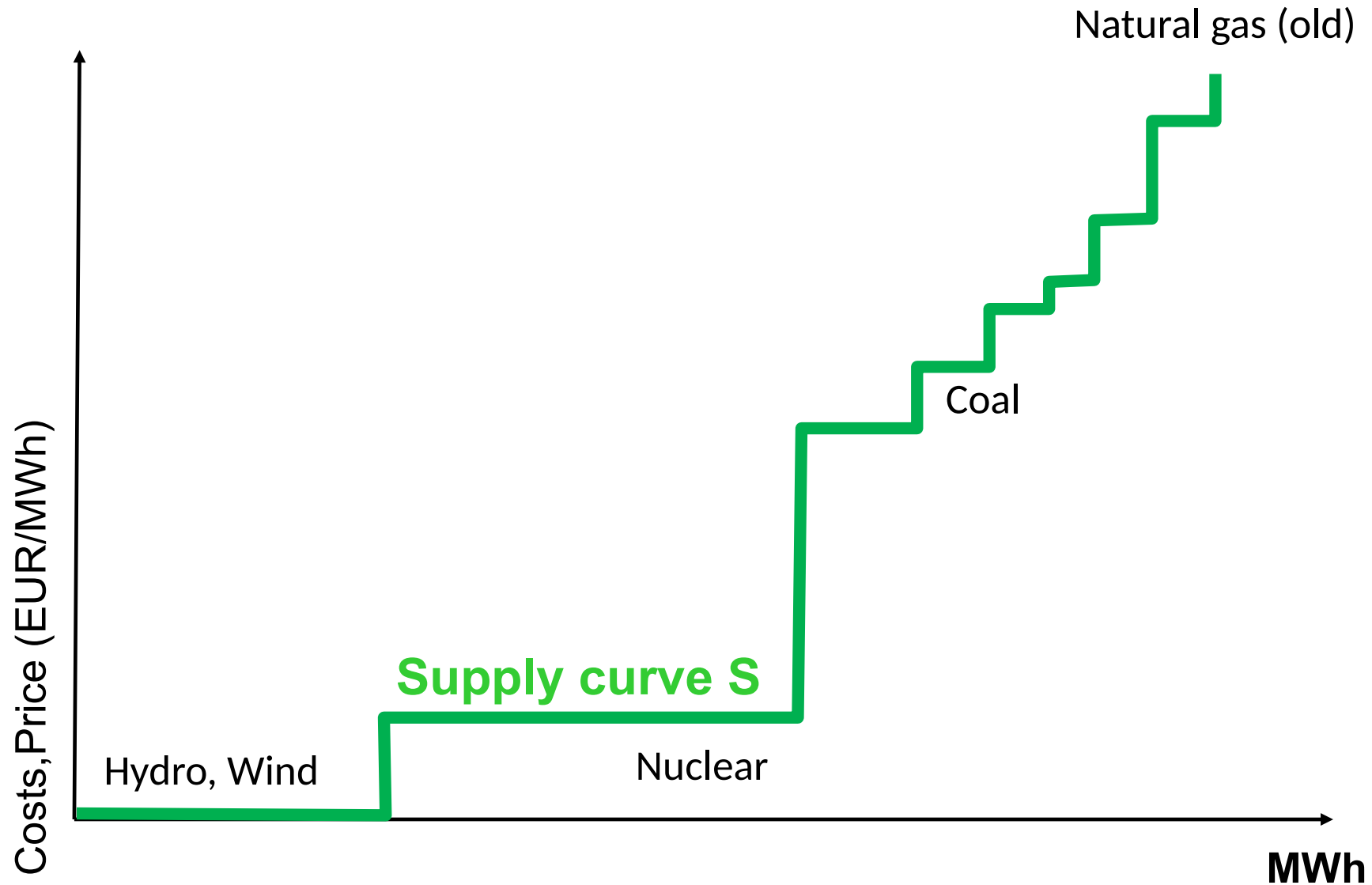
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- * **Better protected and empowered consumers;**
- * **energy market integrity and transparency (ACER) ;**
- * **A competitive European industry with predictable energy costs**
- * **Long-term contracts: PPAs and CfD**
- * **integration of renewables**

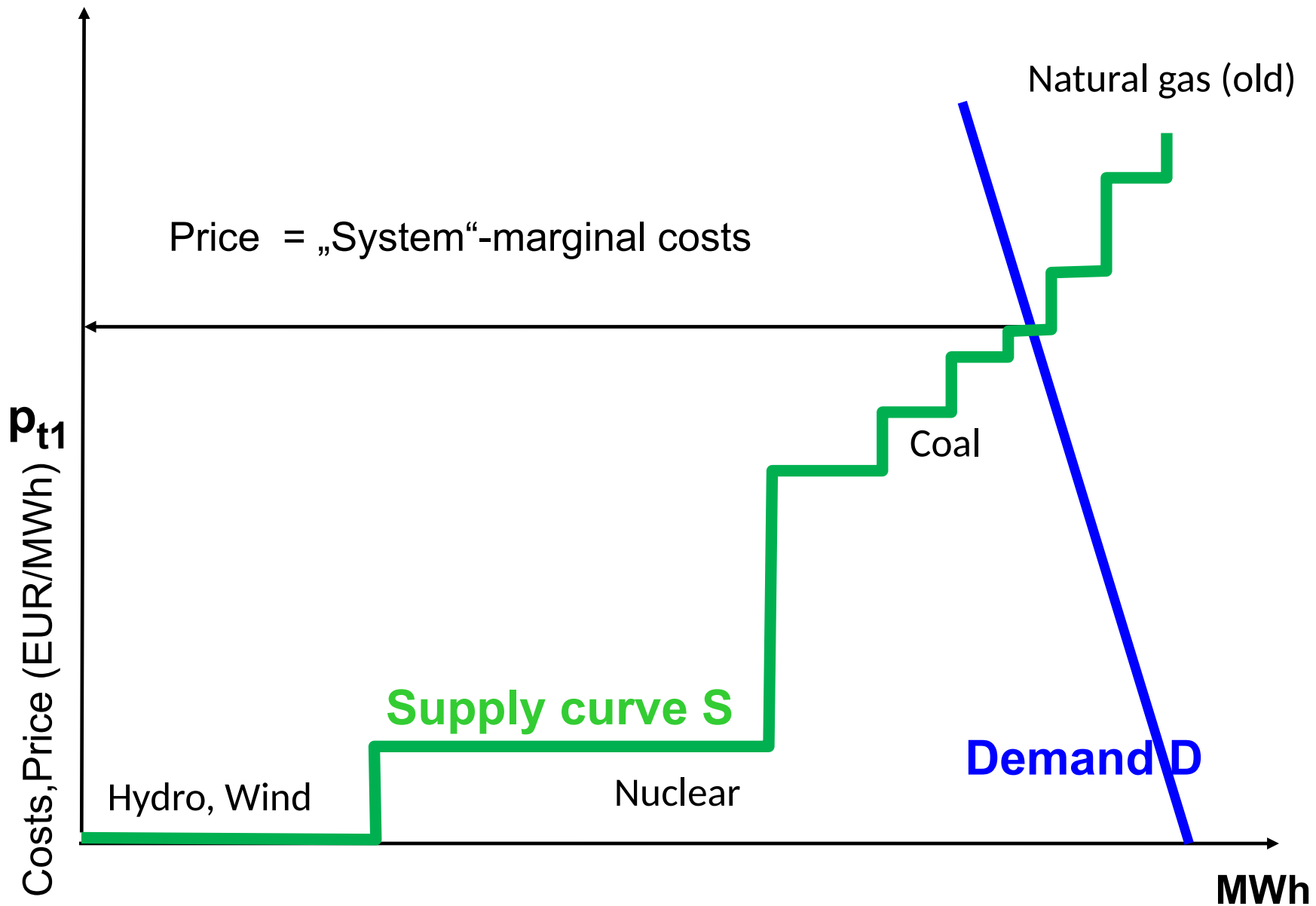


2. EINFLUSS VARIABLER ERNEUERBARER AUF DAS STROMSYSTEM

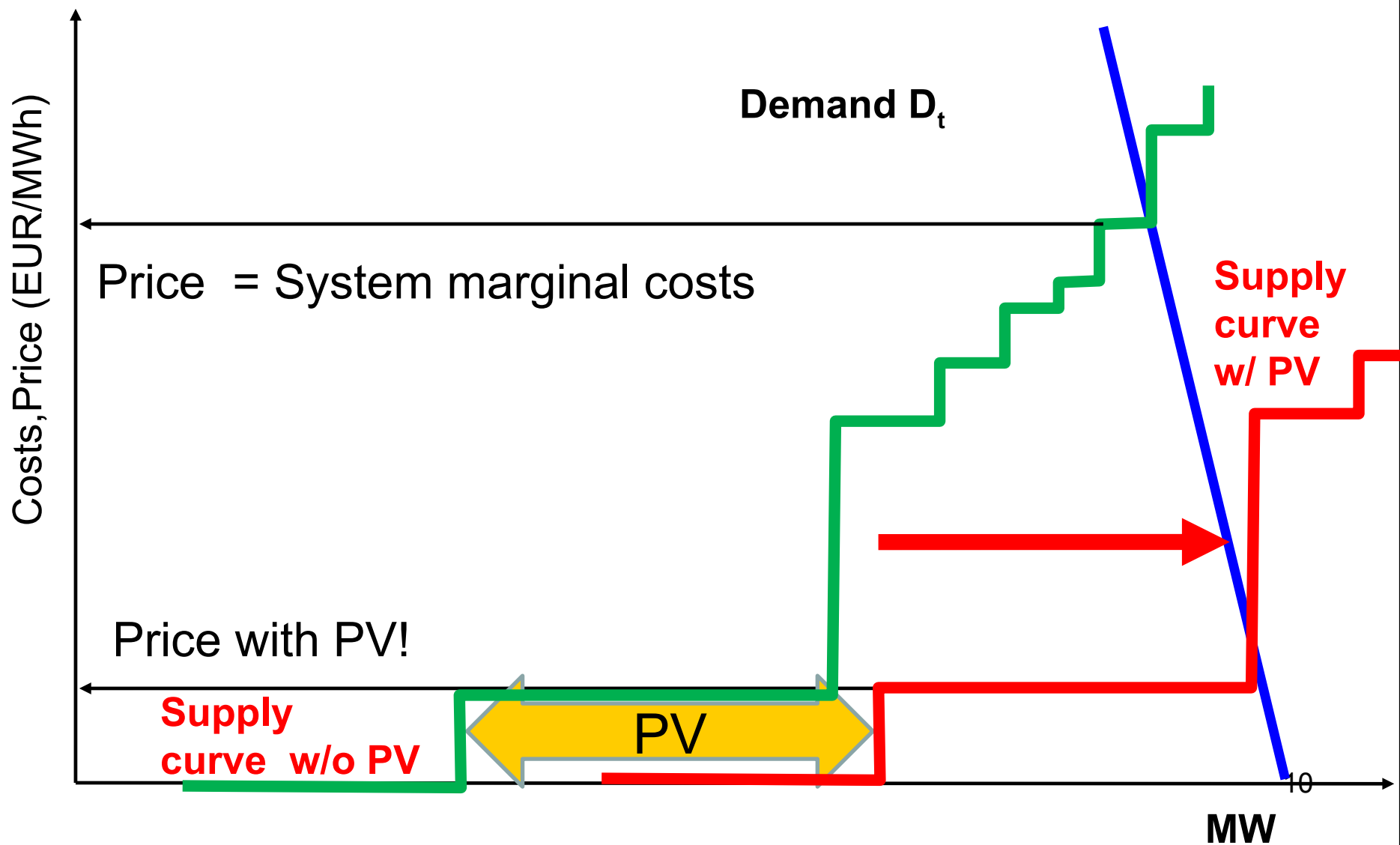
2. STARTING POINT: THE MERIT ORDER CURVE



BASIC PRINCIPLE OF COMPETITION: PRICE = MARGINAL COSTS



Example: prices without and with PV



RES Production

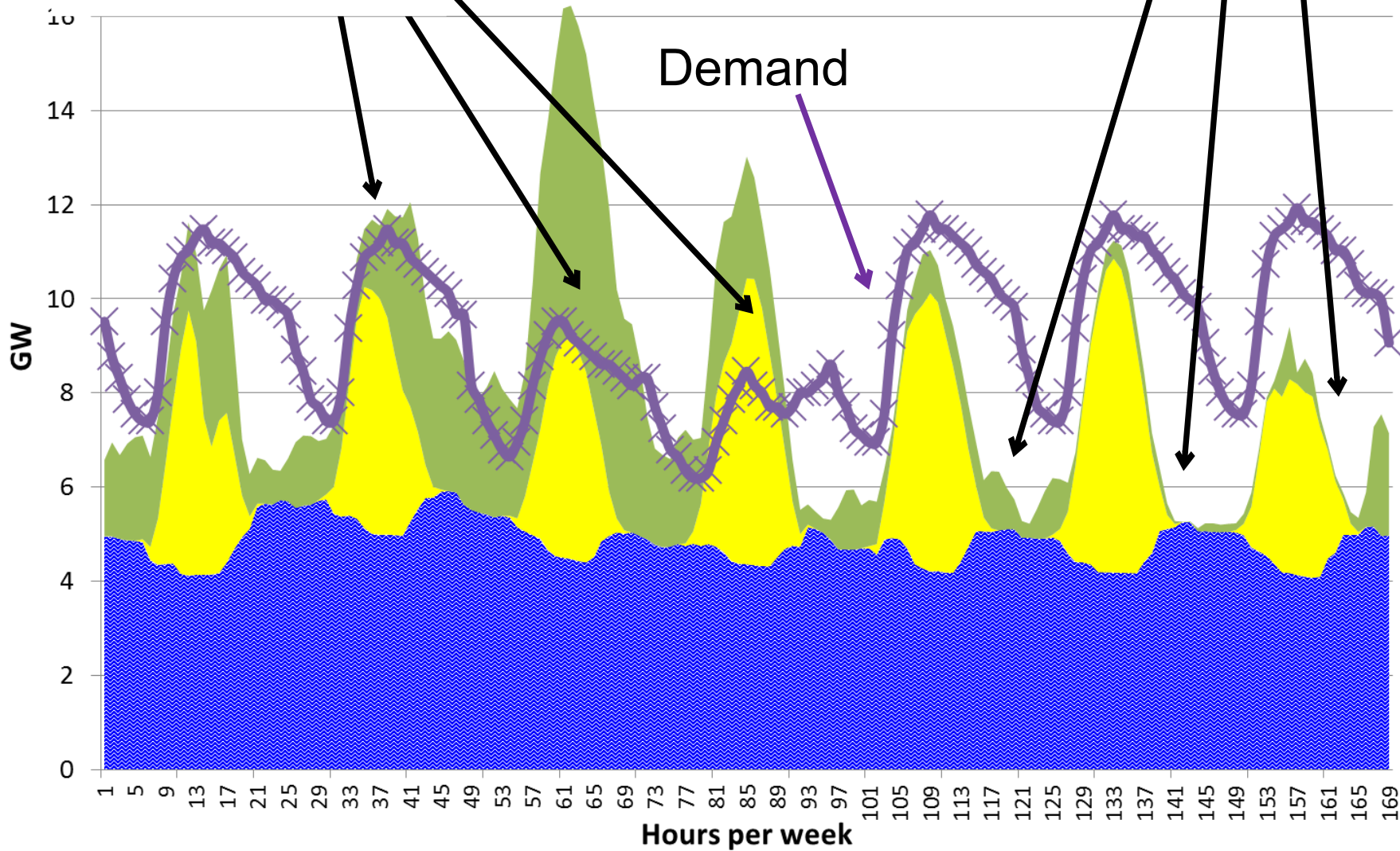
RES Production

< Demand

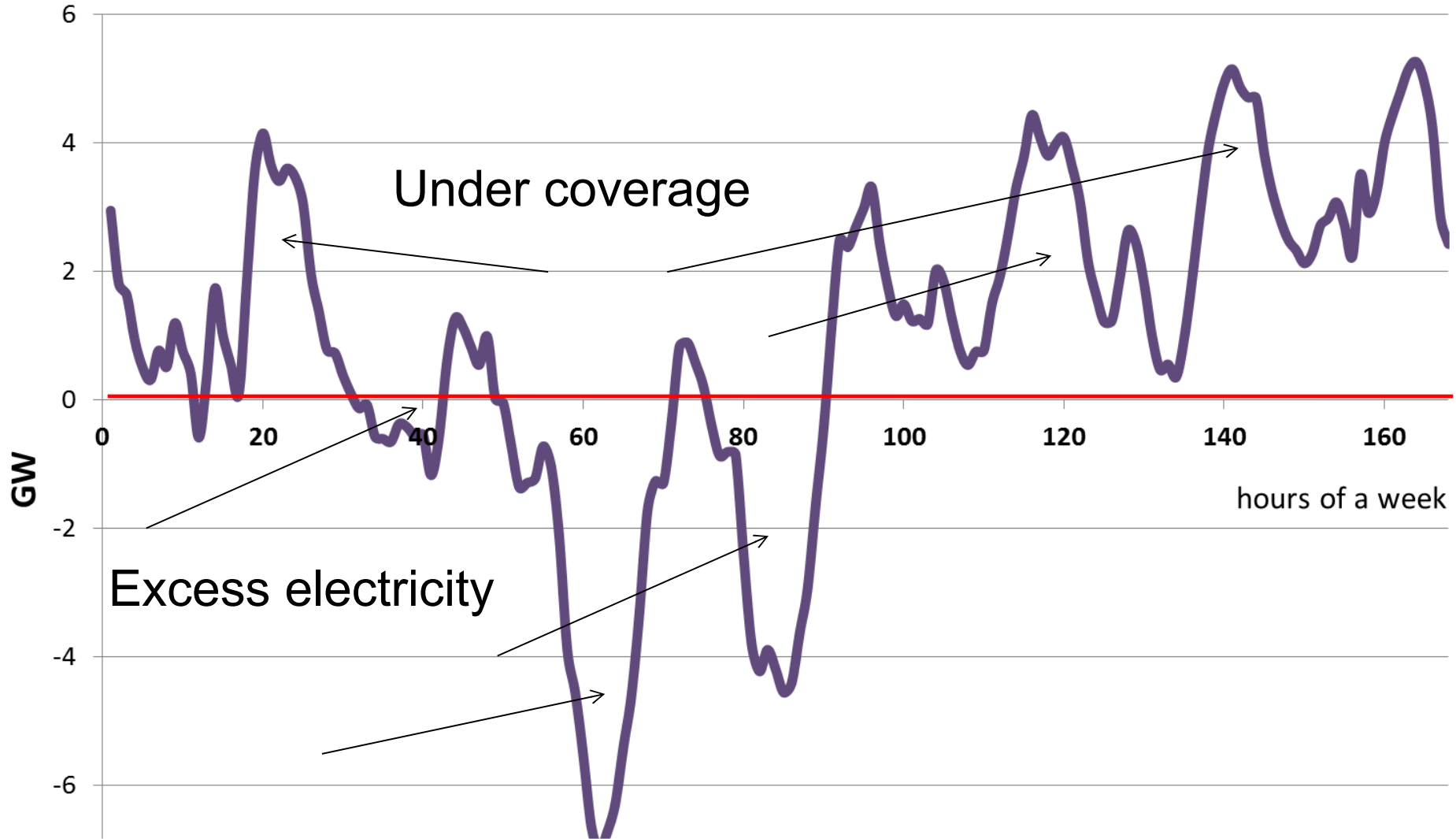
> Demand

on-river hydro PV Wind Load

Demand



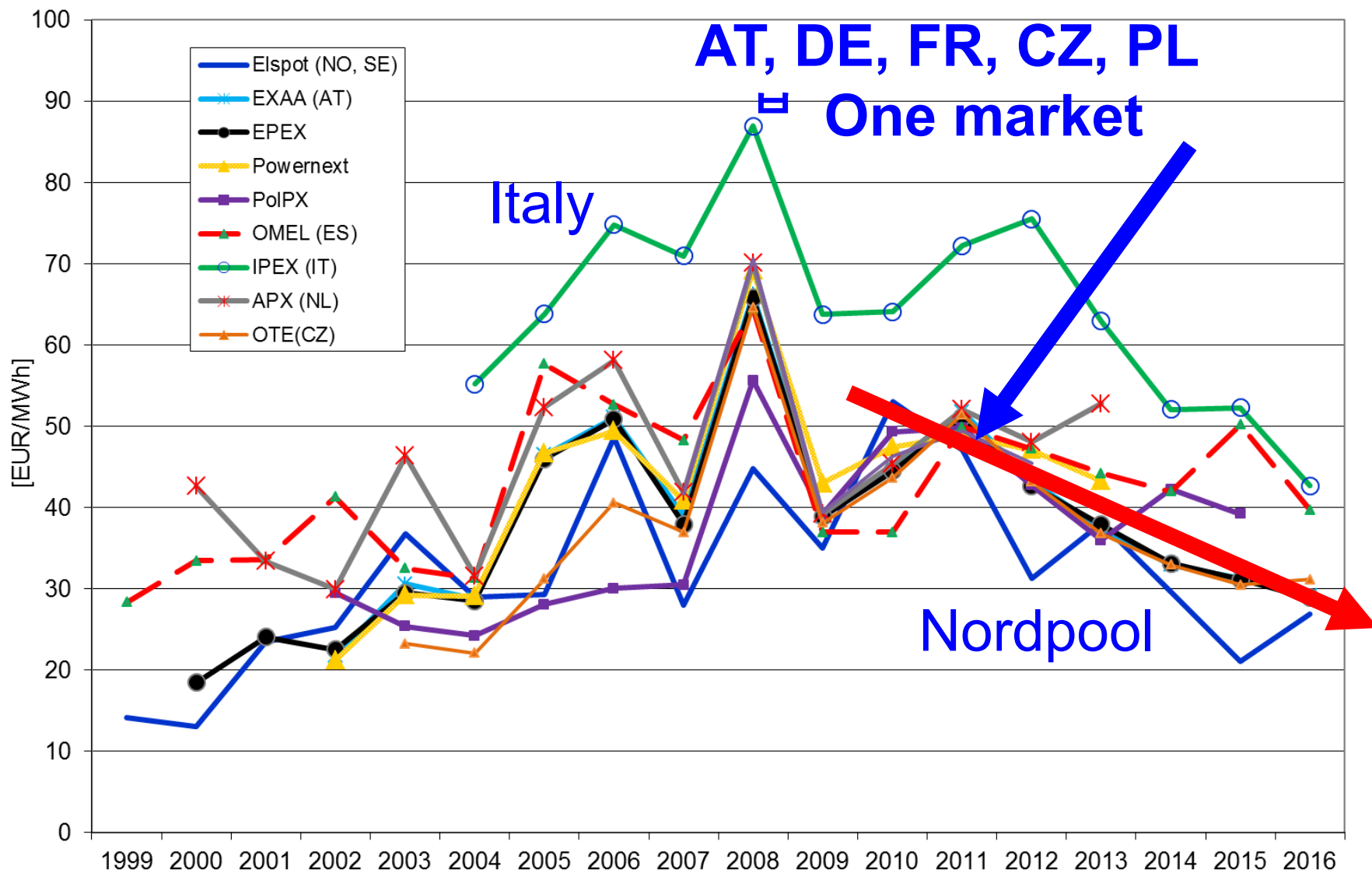
Key term of the future: Residual load



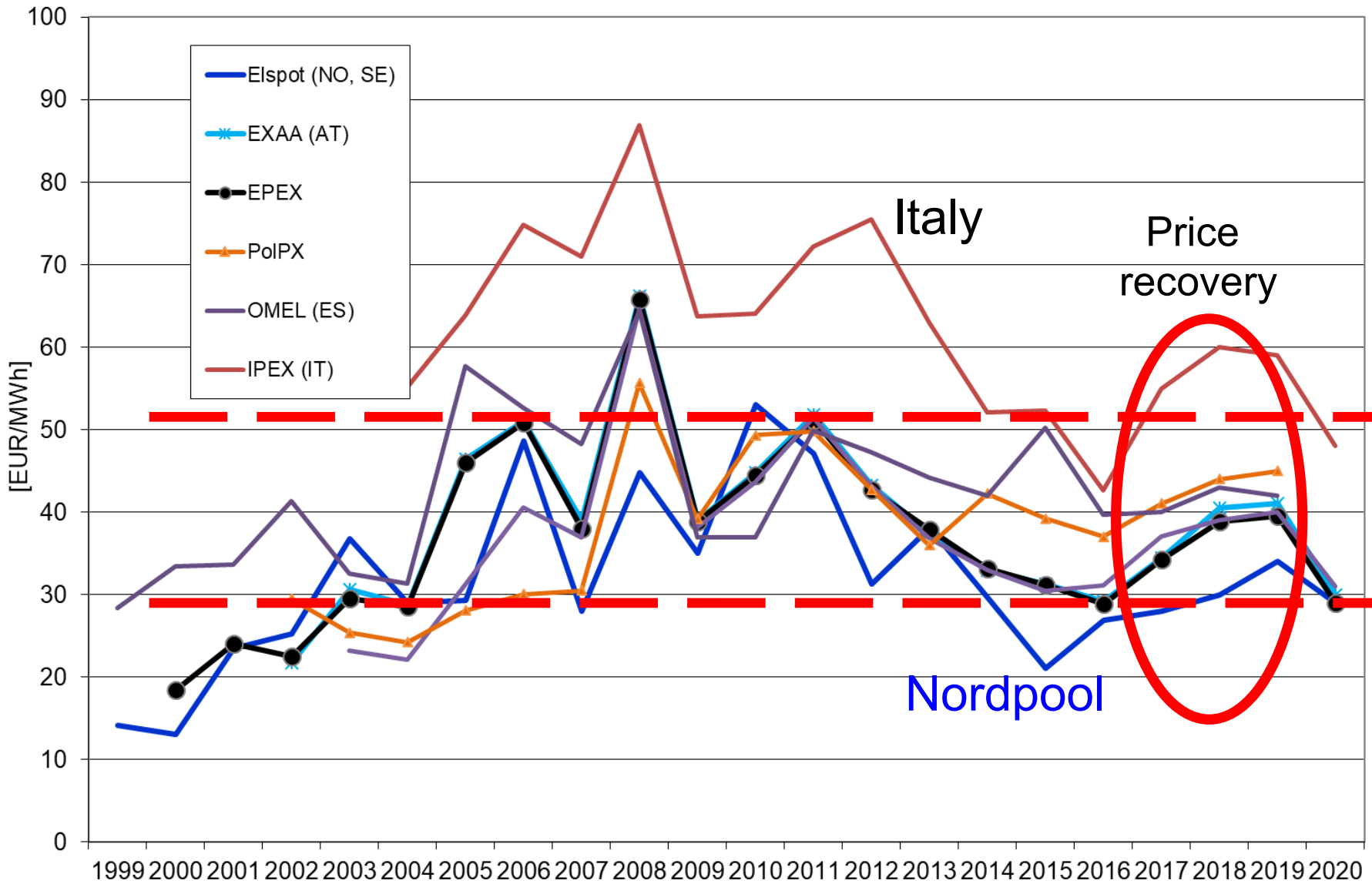
Residual load = Load – non-flexible generation

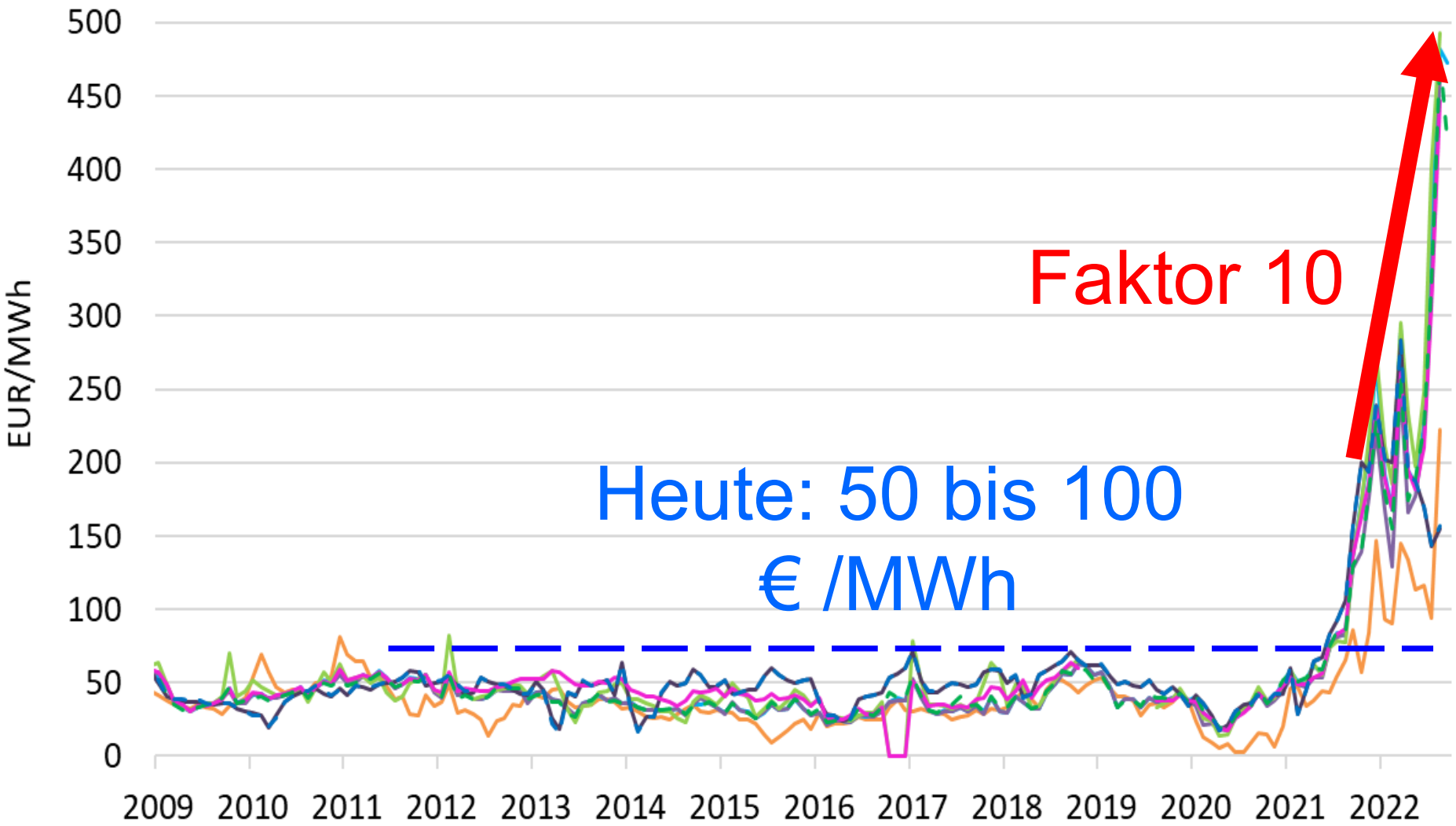
3. Strompreise in Day-ahead- Märkten

Development of electricity prices in Europe up to 2016 (1)



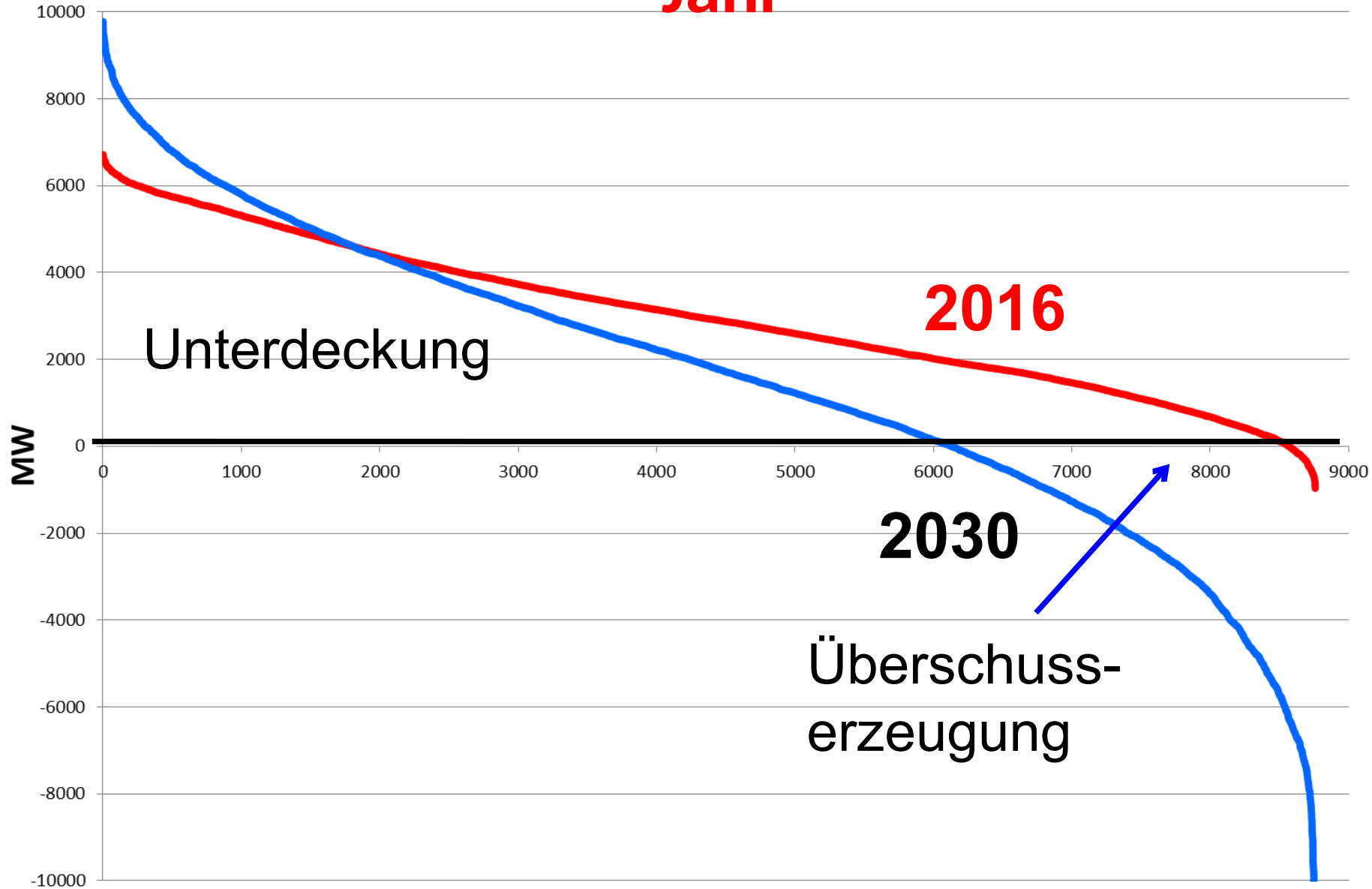
Development of day-ahead electricity prices in Europe per year (2)





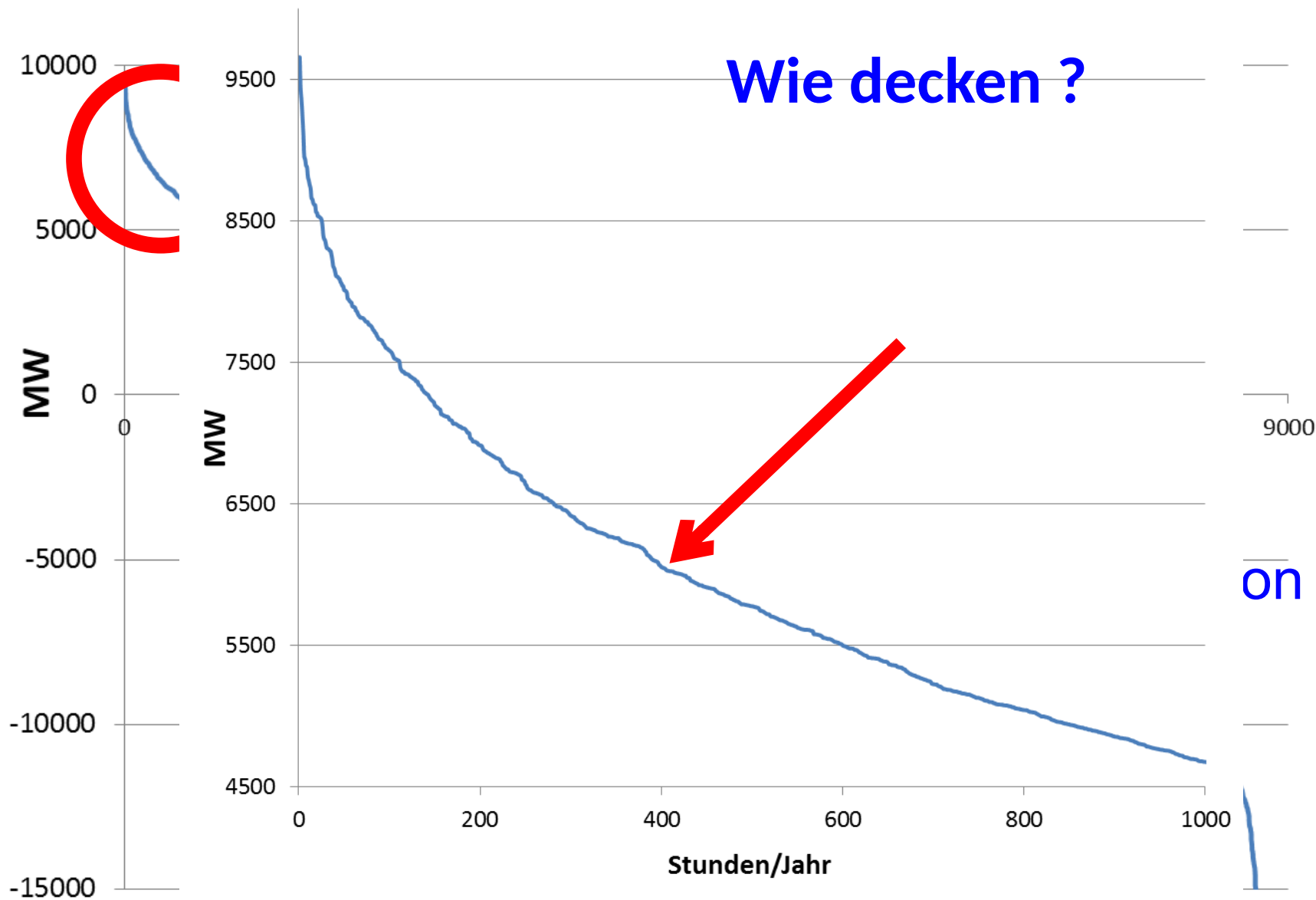
- Elspot (NO, SE, FI)
- EXAA (AT)
- EEX (DE)
- Powernext FR
- OMEL (ES)
- APX (NL)
- PXE OTE (CZ)
- OMEL Portugal

Geordnete Residuallast über ein Jahr



Geordnete Residuallast über ein Jahr

Geordnete Residuallast



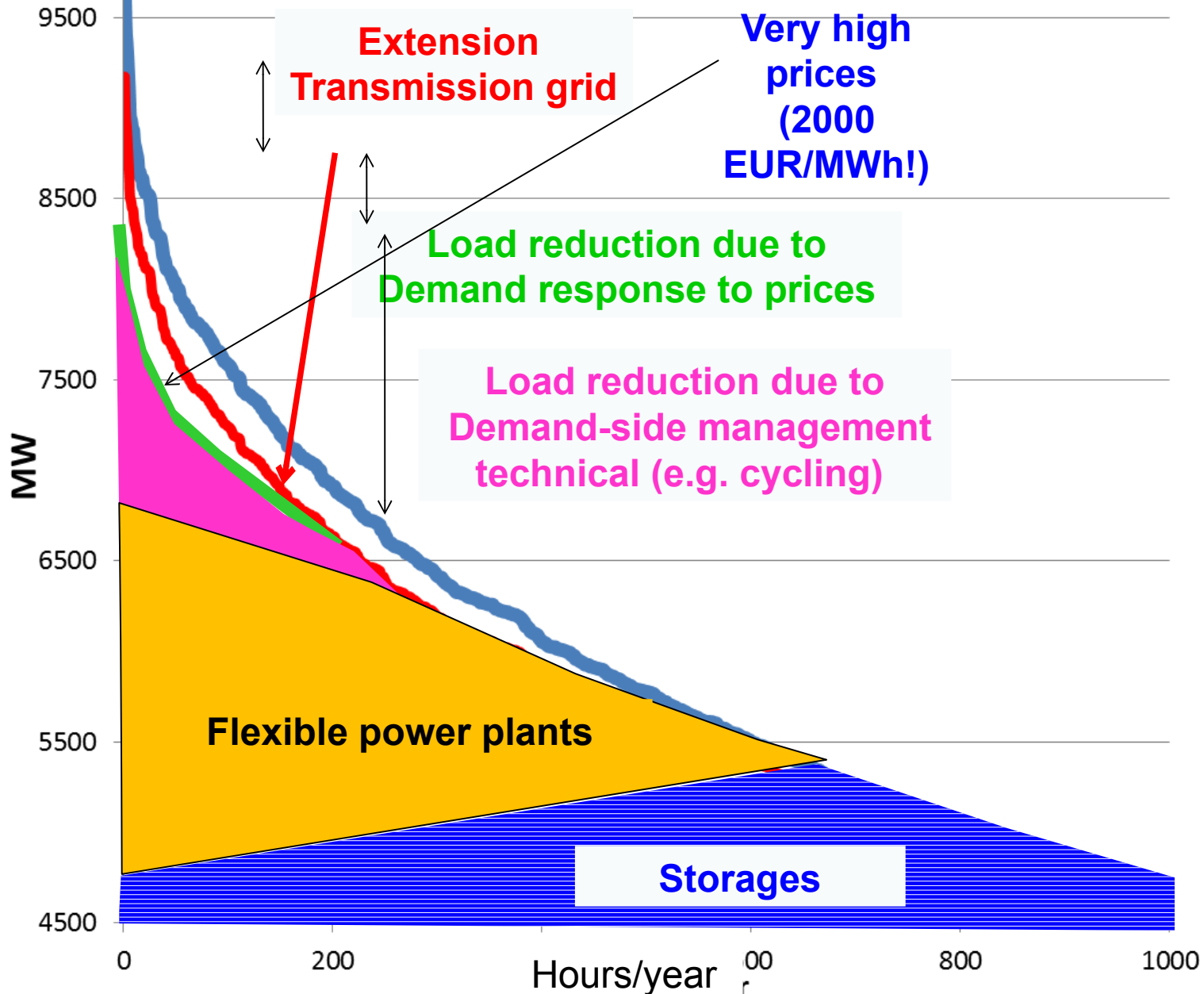
**Durch regulierte Kapazitätzahlungen mit STMC
–Preisen ?**

oder

**durch Wettbewerb zwischen angebots- und
nachfrageseitigen Technologies und Verhalten
(incl. Storages, grid and other flexibility
options) mit (korrekten)
Knappheitspreissignalen?**

4. Flexibilität

Flexible Deckung der Residuallast



Very high prices
(2000 EUR/MWh!)

Extension
Transmission grid

Load reduction due to
Demand response to prices

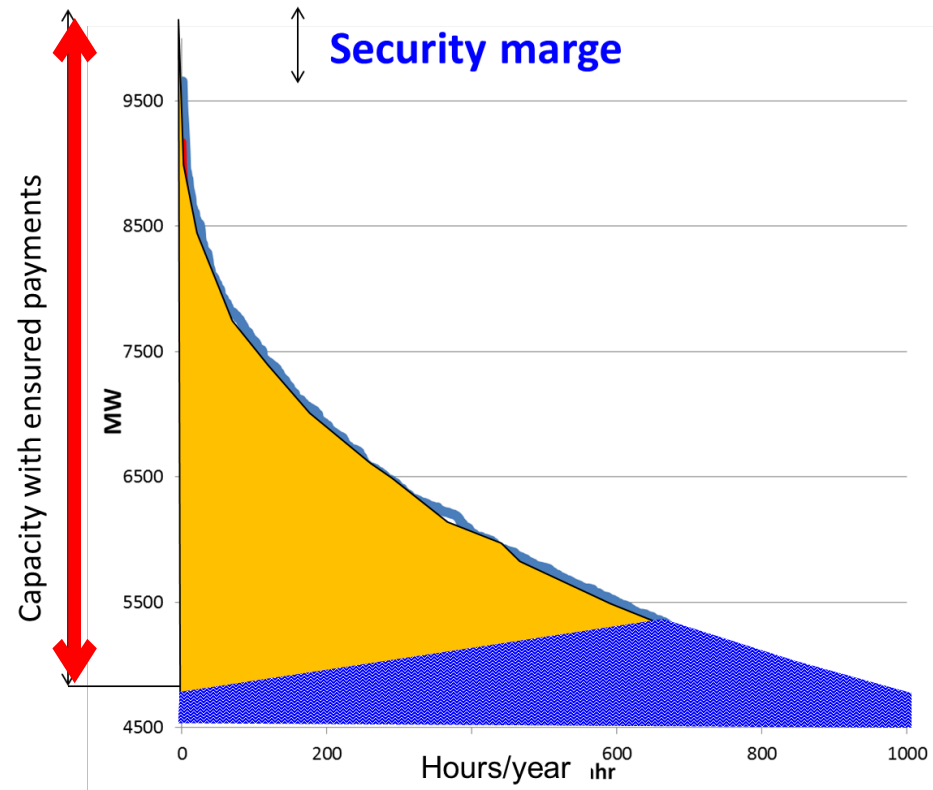
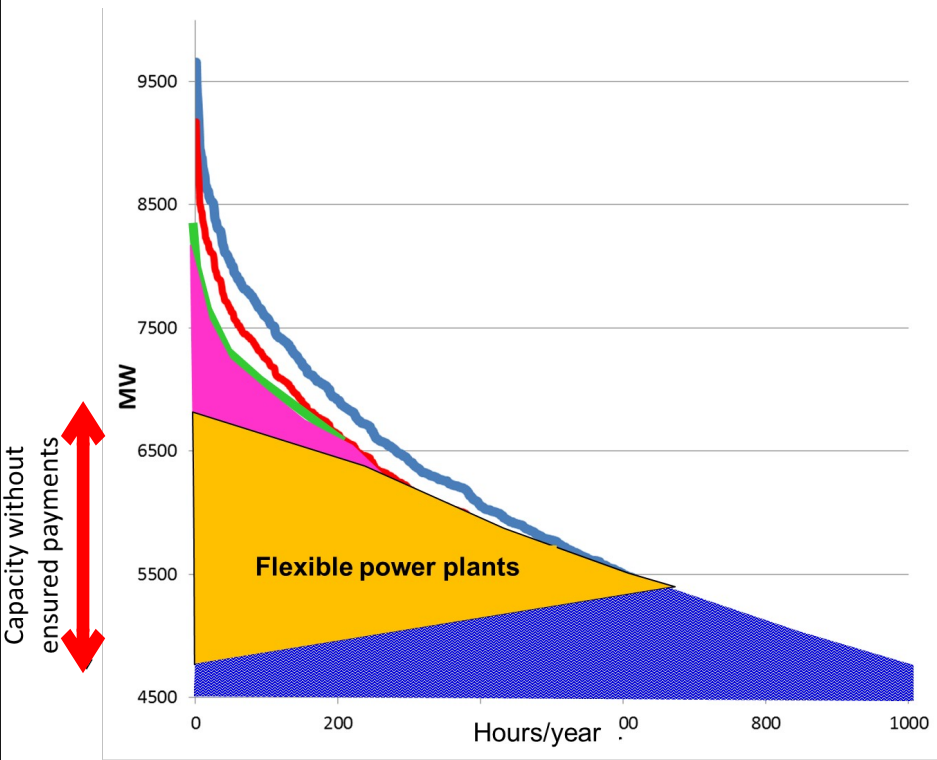
Load reduction due to
Demand-side management
technical (e.g. cycling)

Flexible power plants

Storages

Capacity without
ensured payments

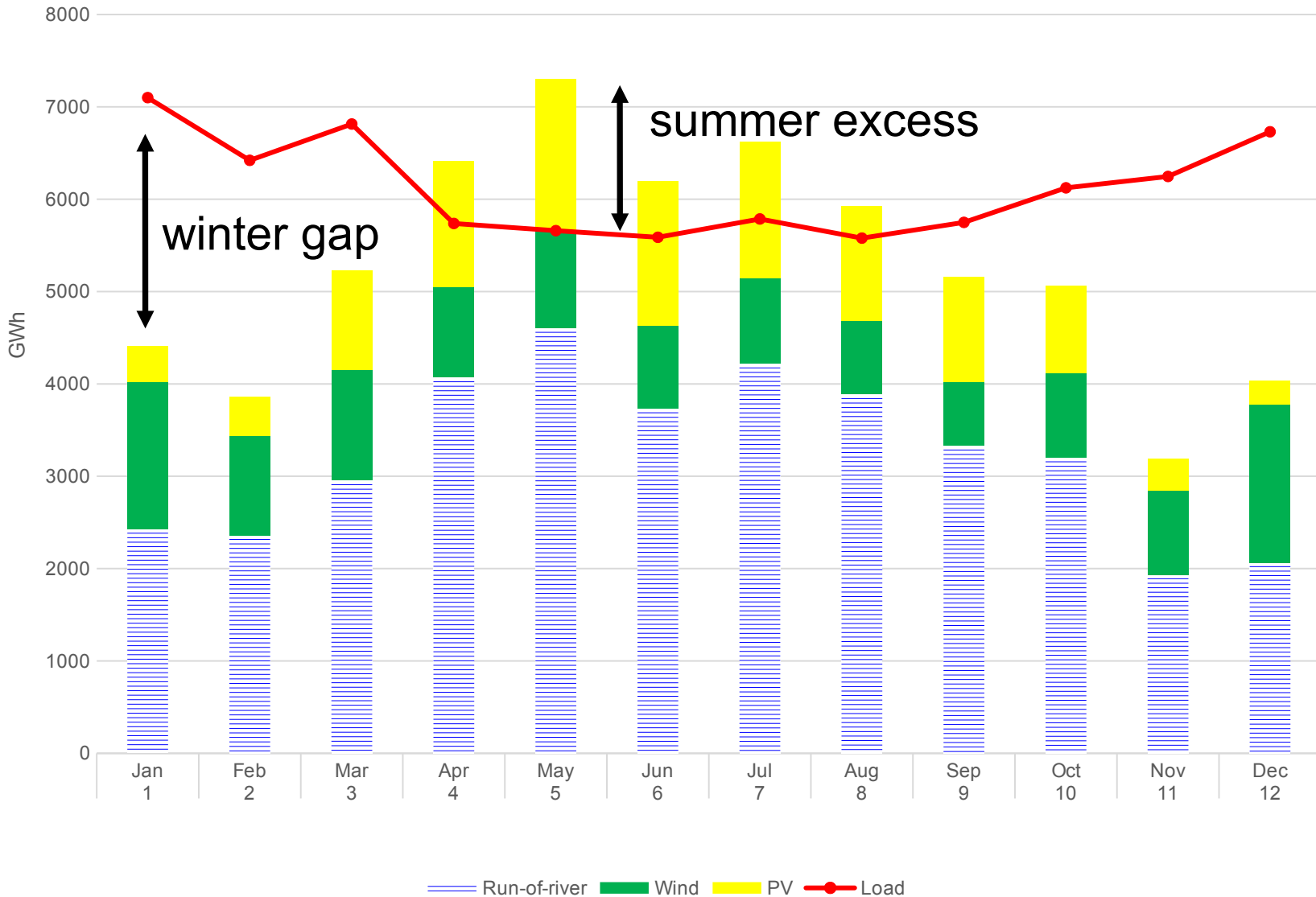
Comparison



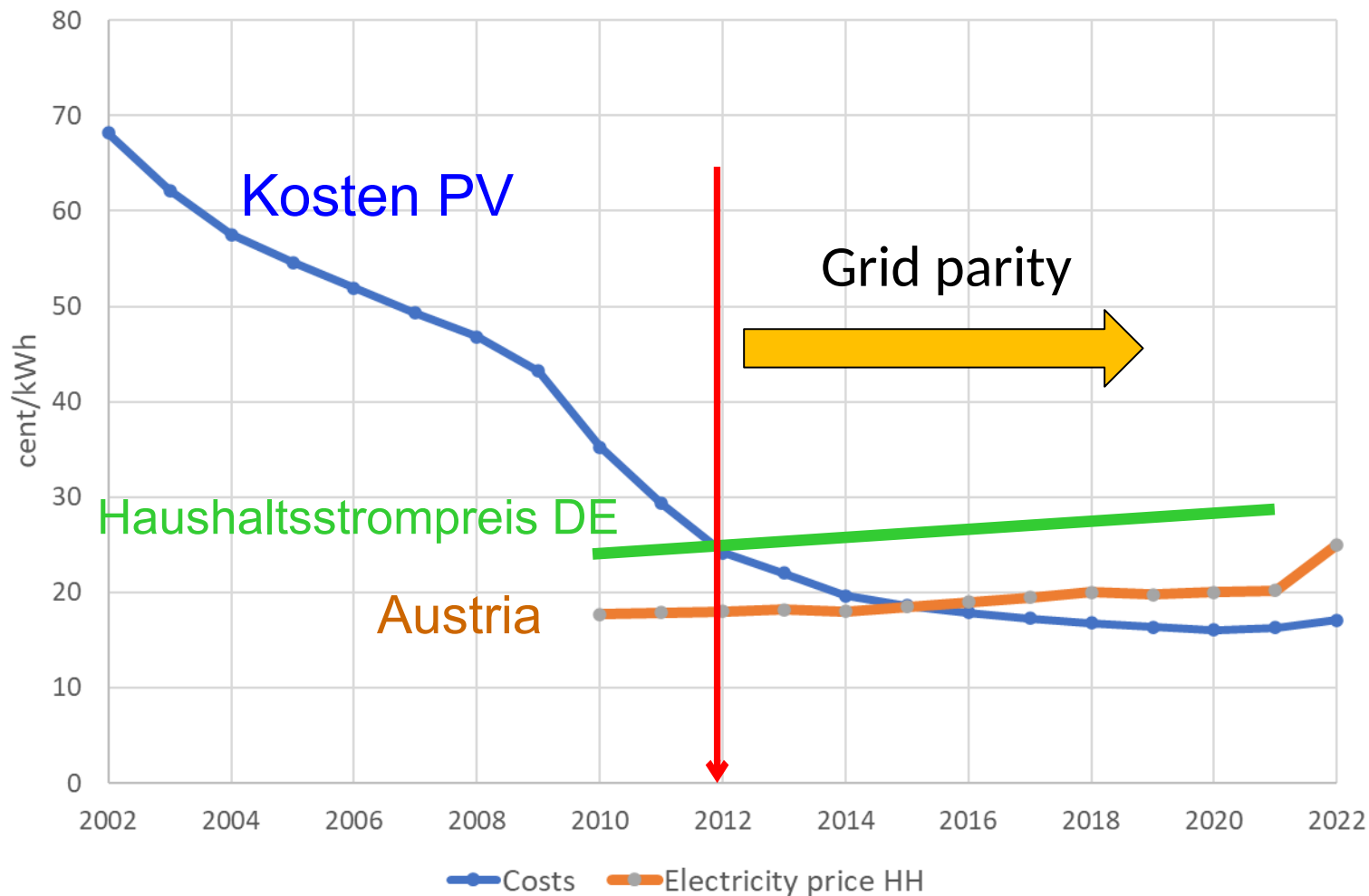
Sinnlos, jede Leistungs- spitze zu speichern



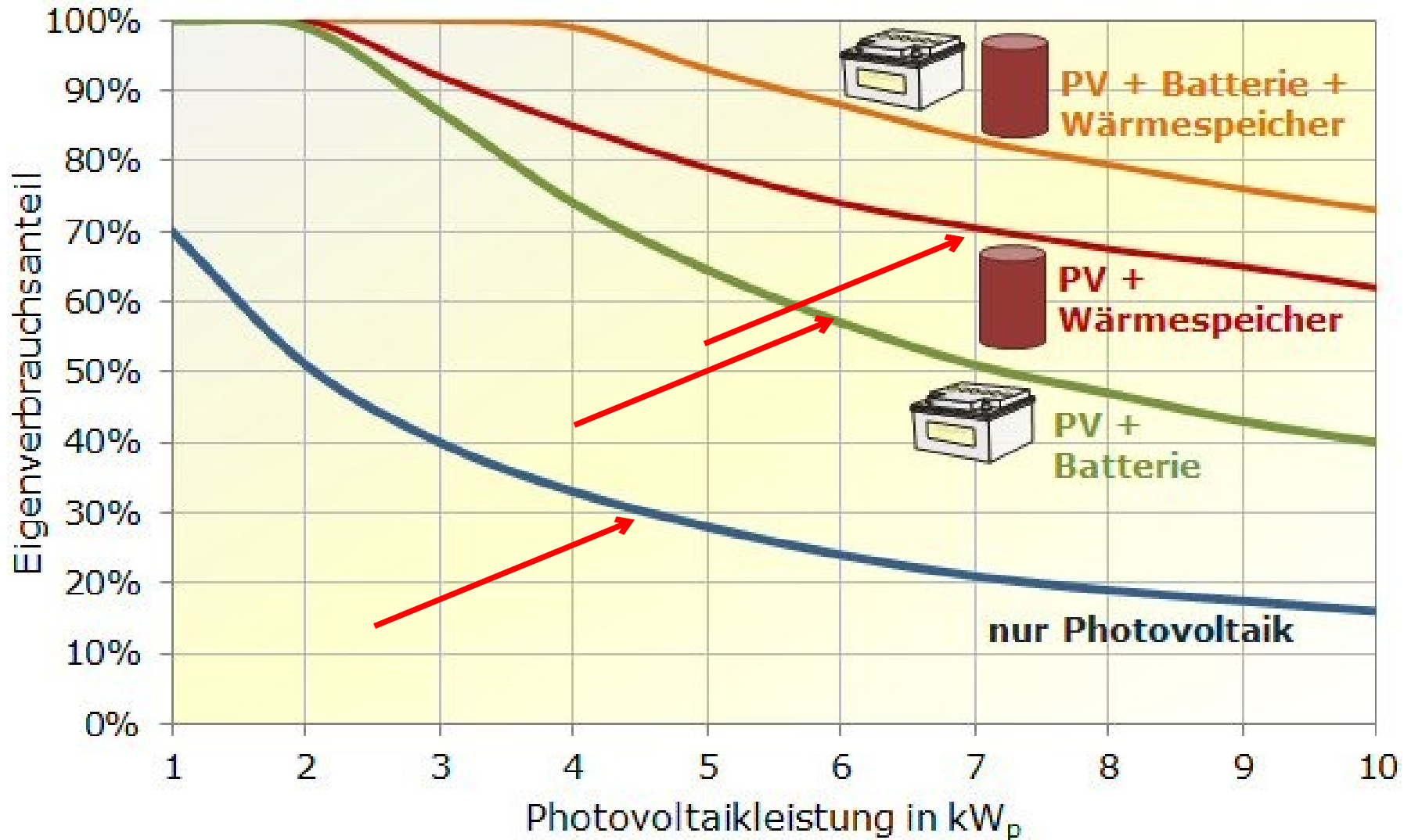
Sommer vs Winter: Wie ?



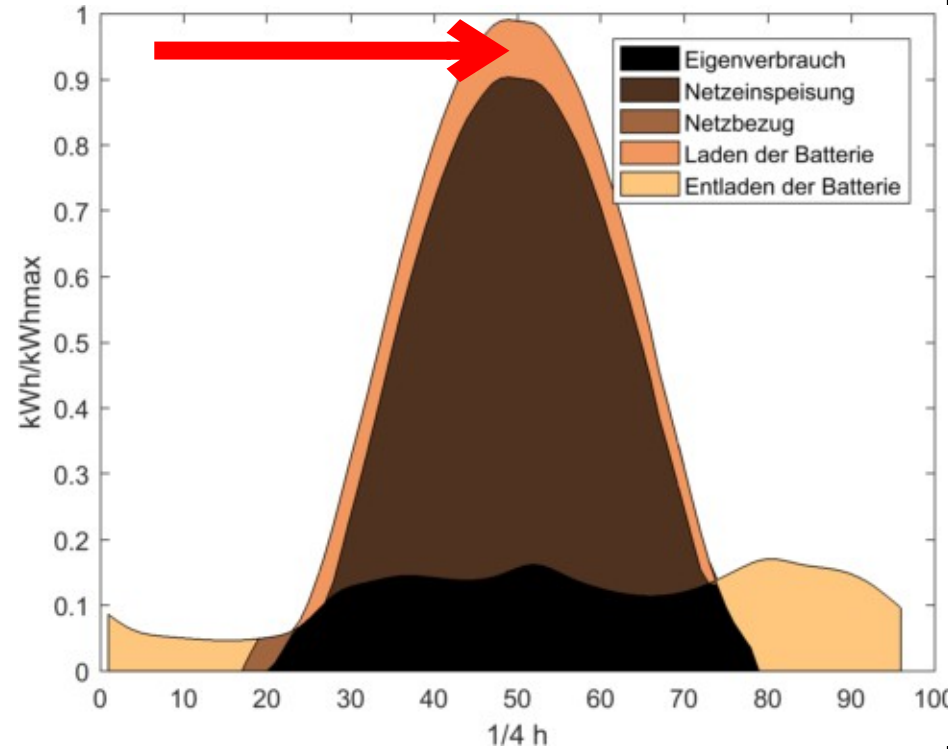
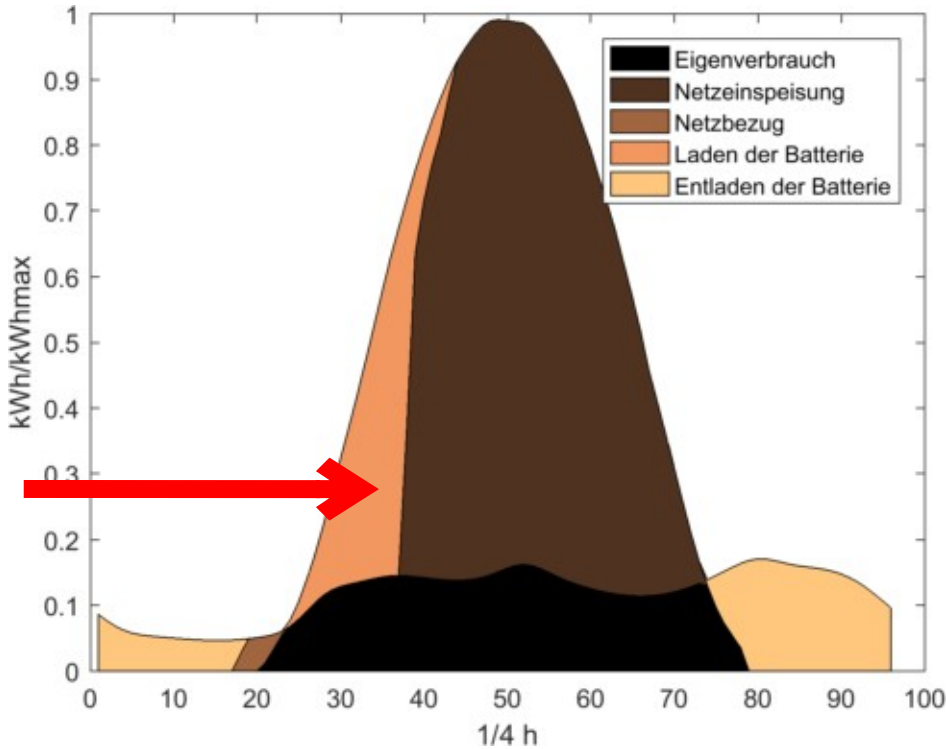
5. Prosumagers und Energiegemeinschaften

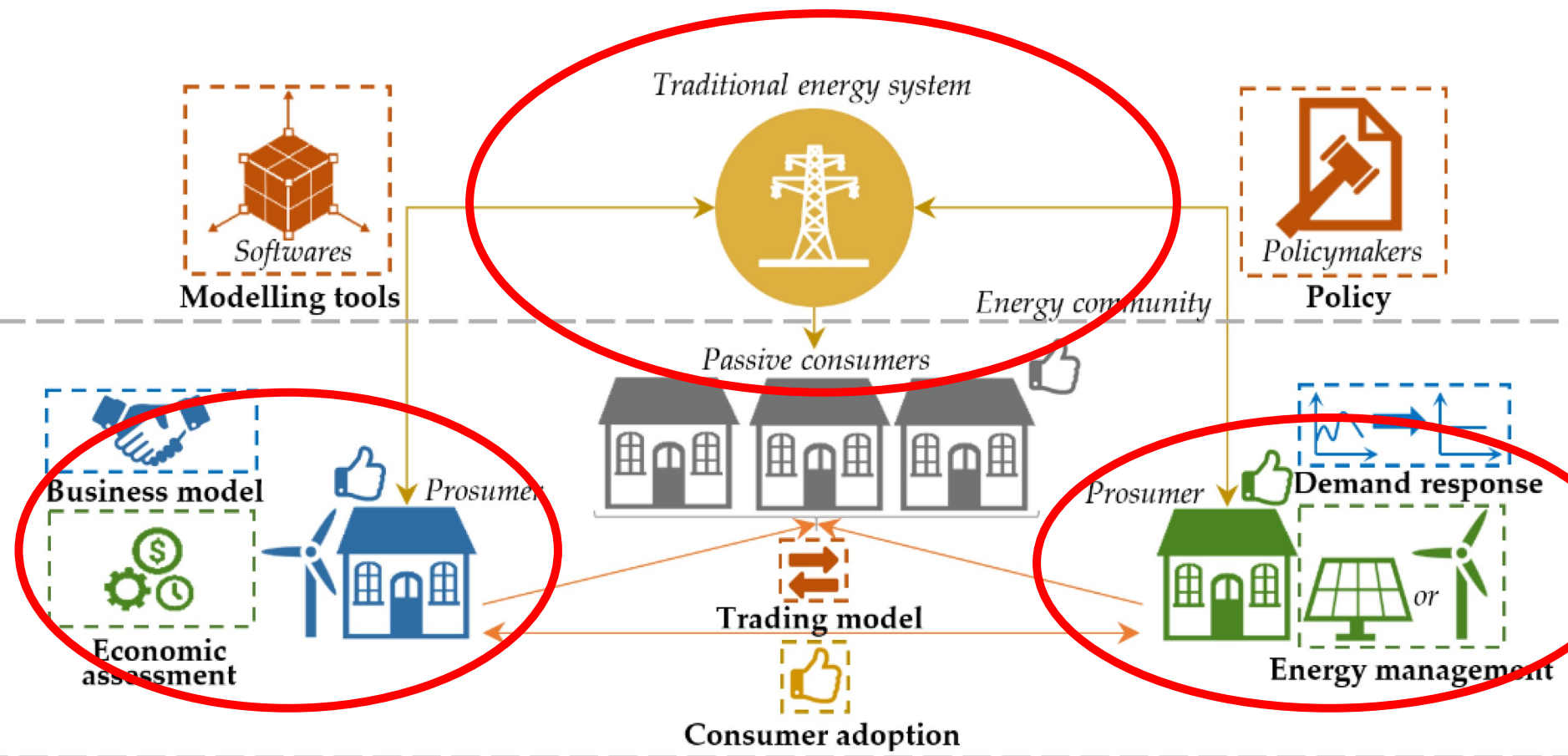


Eigenverbrauchsanteil:

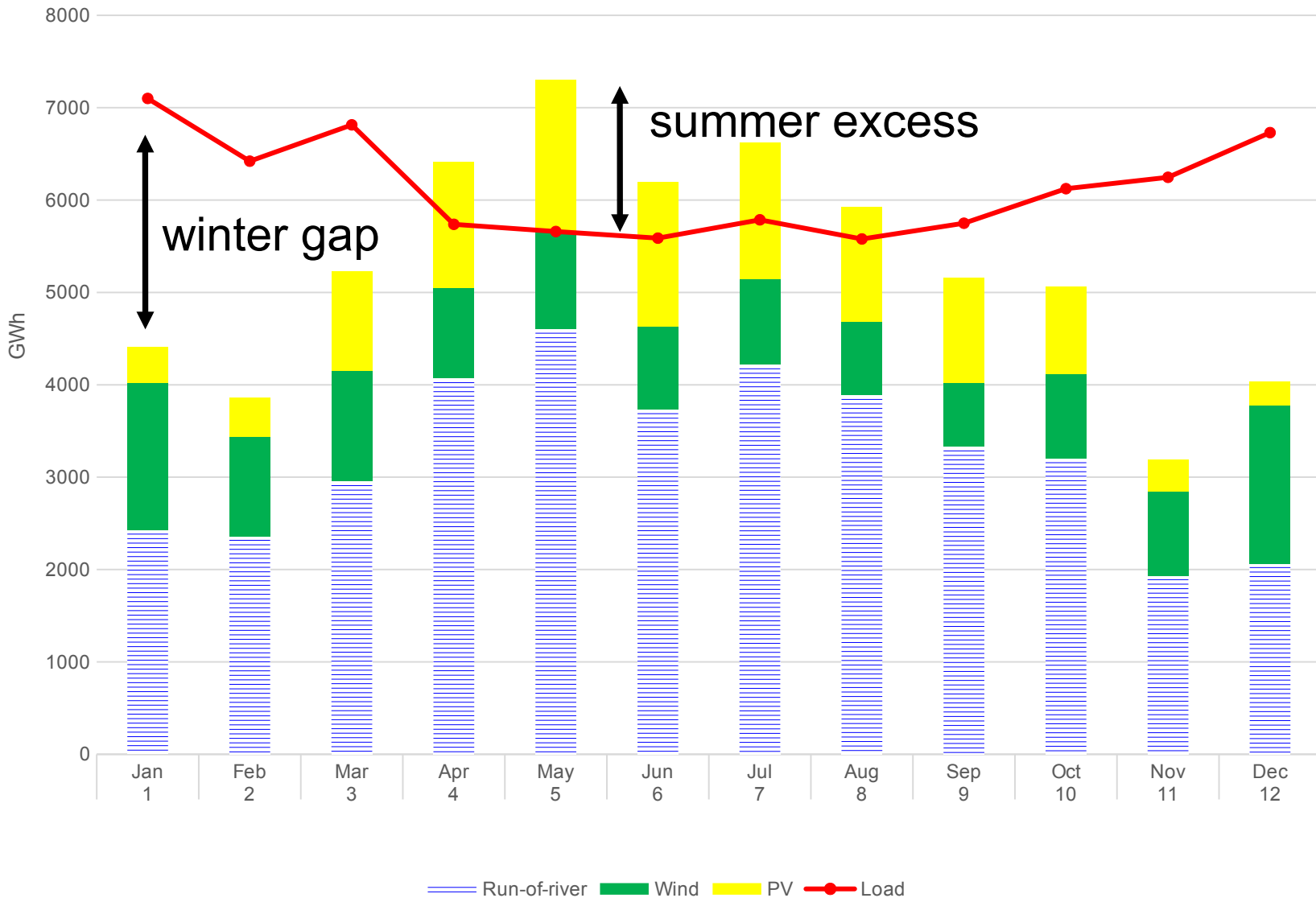


Koordinierte und nicht koordinierte Speichernutzung





Sommer vs Winter: Wie ?



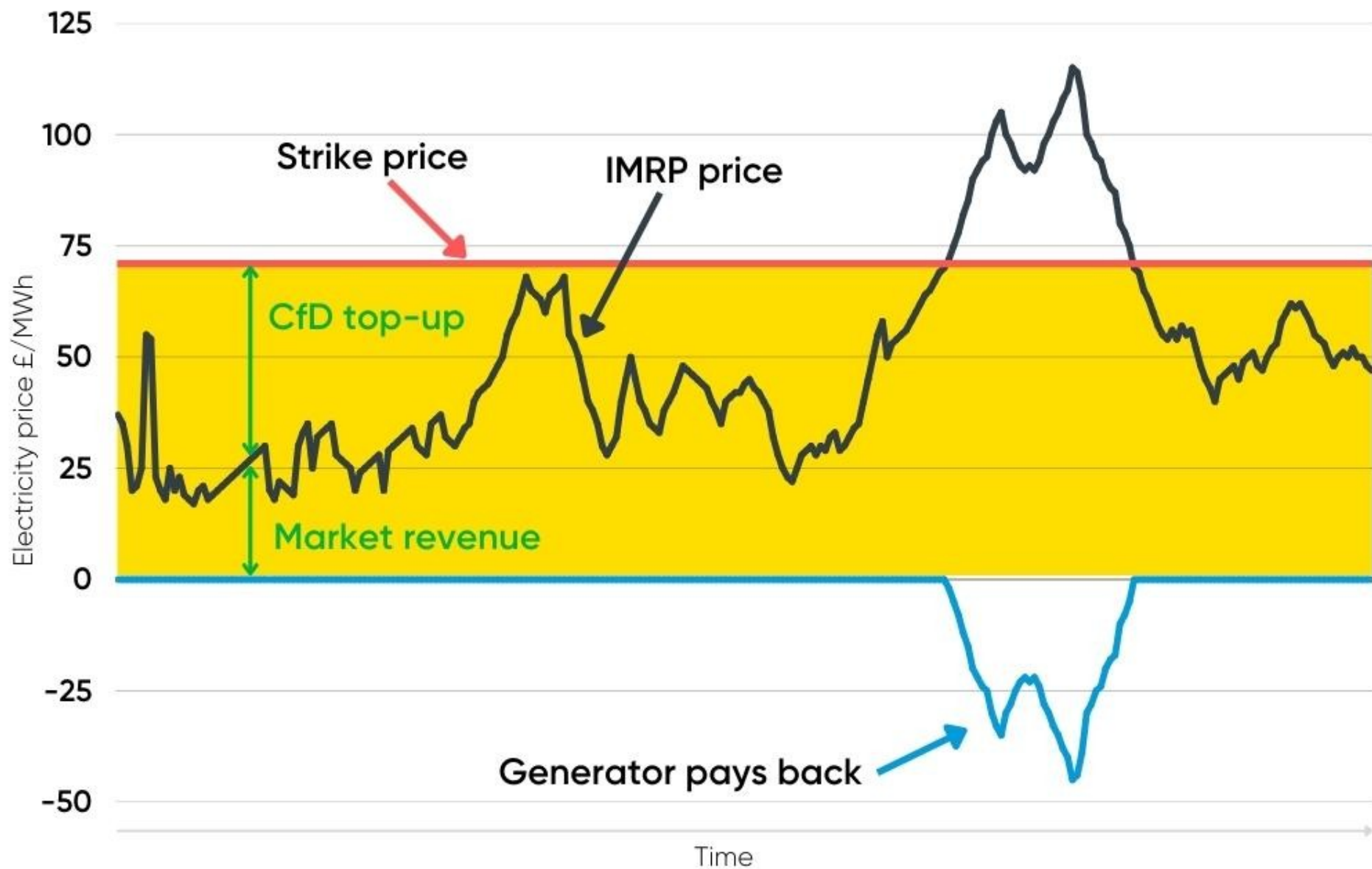
(OFFENE) FRAGEN ZU EEGs:

- * Residuallast – versorger ?**
- * (Gerechteres) neues Preis- und Tarifsysteem?**

6. Re-Design der Strommärkte

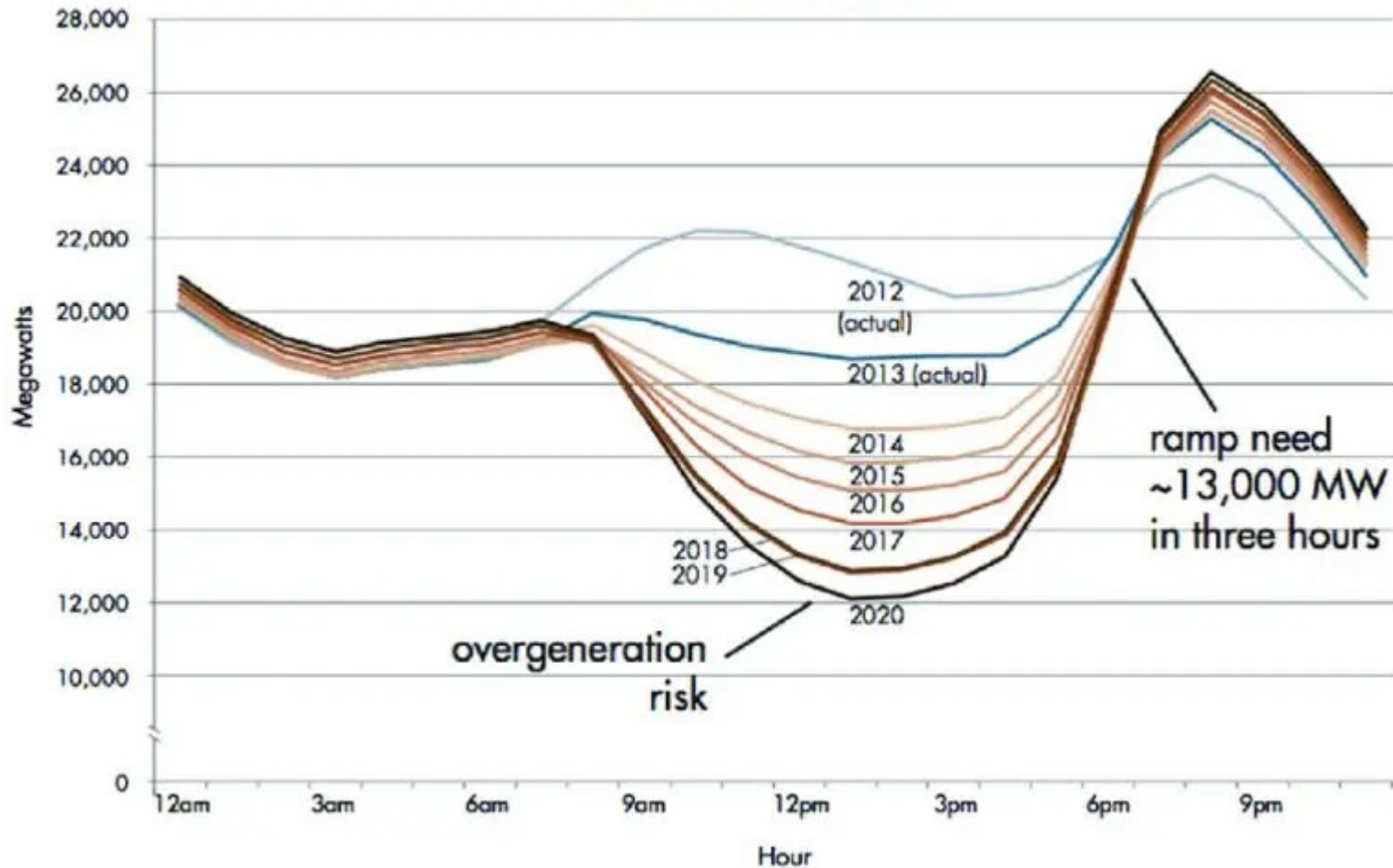
- **Was ist ein lang-fristiger Markt?**
- **Wie streng sollte eine Regulierungsbehörde (oder die EU) intervenieren ?**
- **Wie werden die Investkosten variabler erneuerbarer wiedergewonnen wenn $P=0$?**
- **C f D und PPA etablieren**

An overview of the CfD mechanism (example)



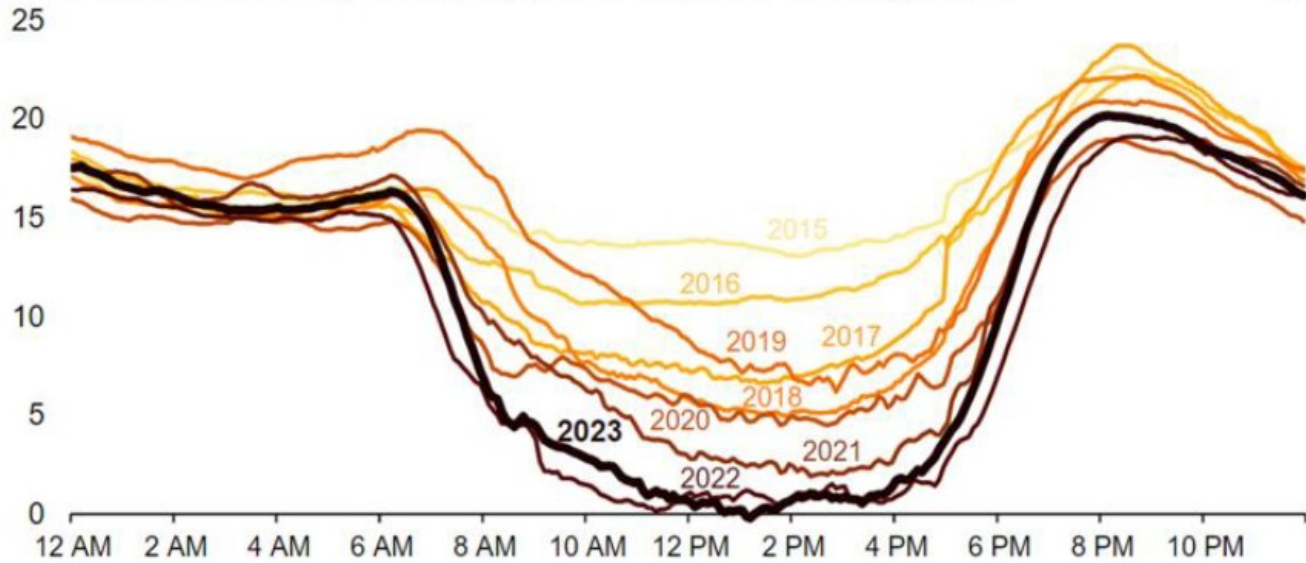
Figures used are for illustrative purposes only.

Net load - March 31



California's duck curve is getting deeper

CAISO lowest net load day each spring (March–May, 2015–2023), gigawatts

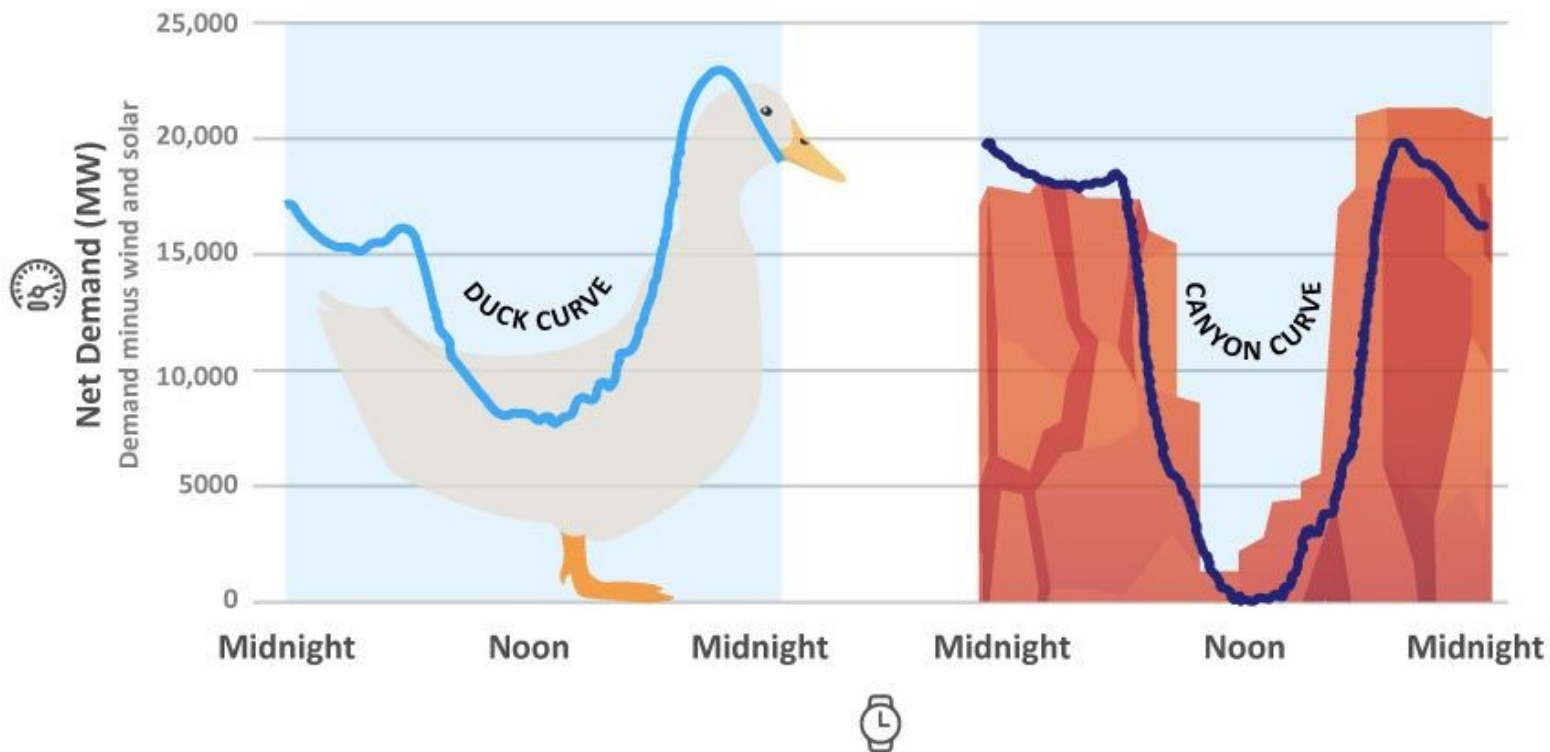


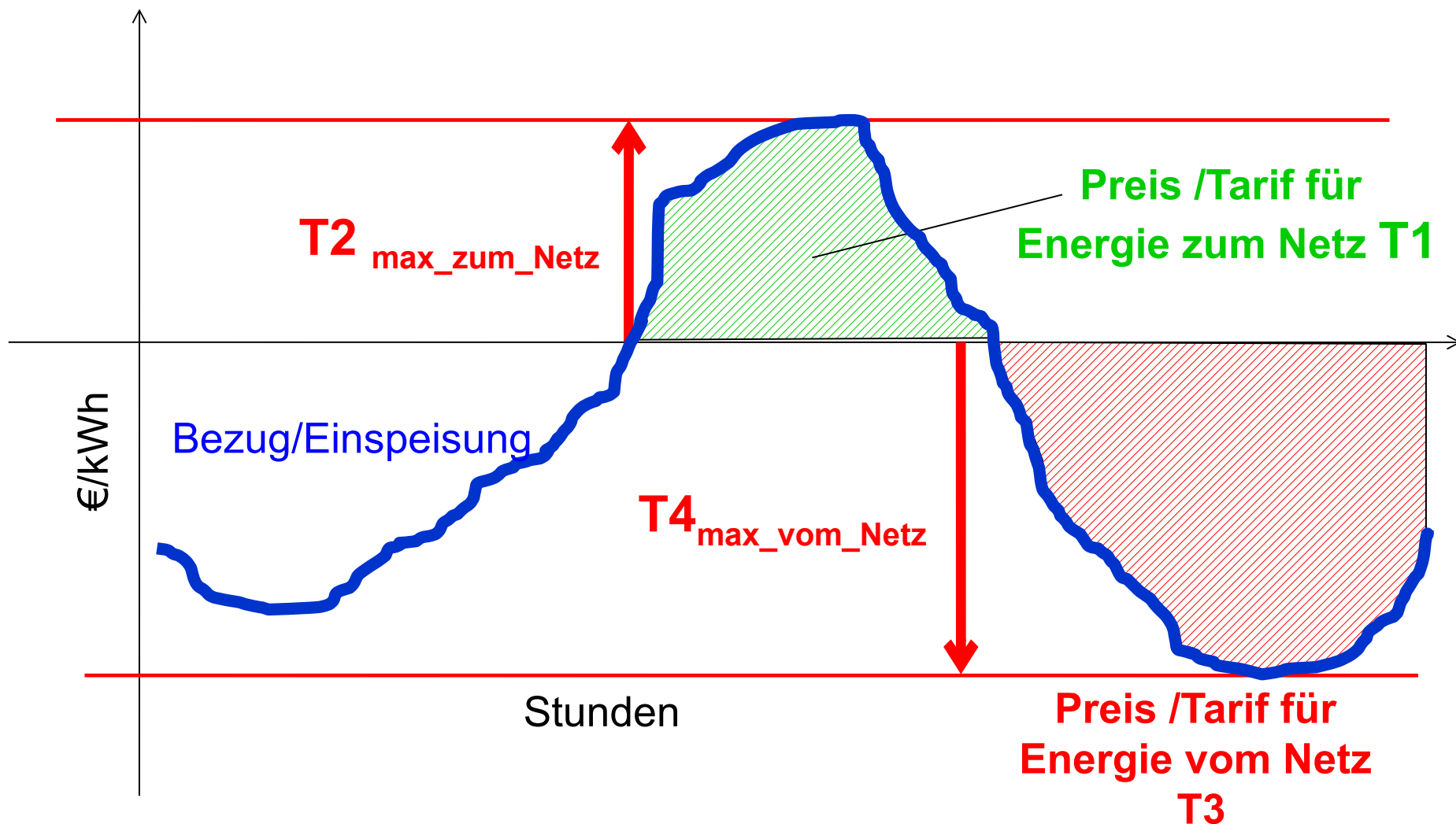
Data source: [California Independent System Operator \(CAISO\)](#)

Source: CAISO

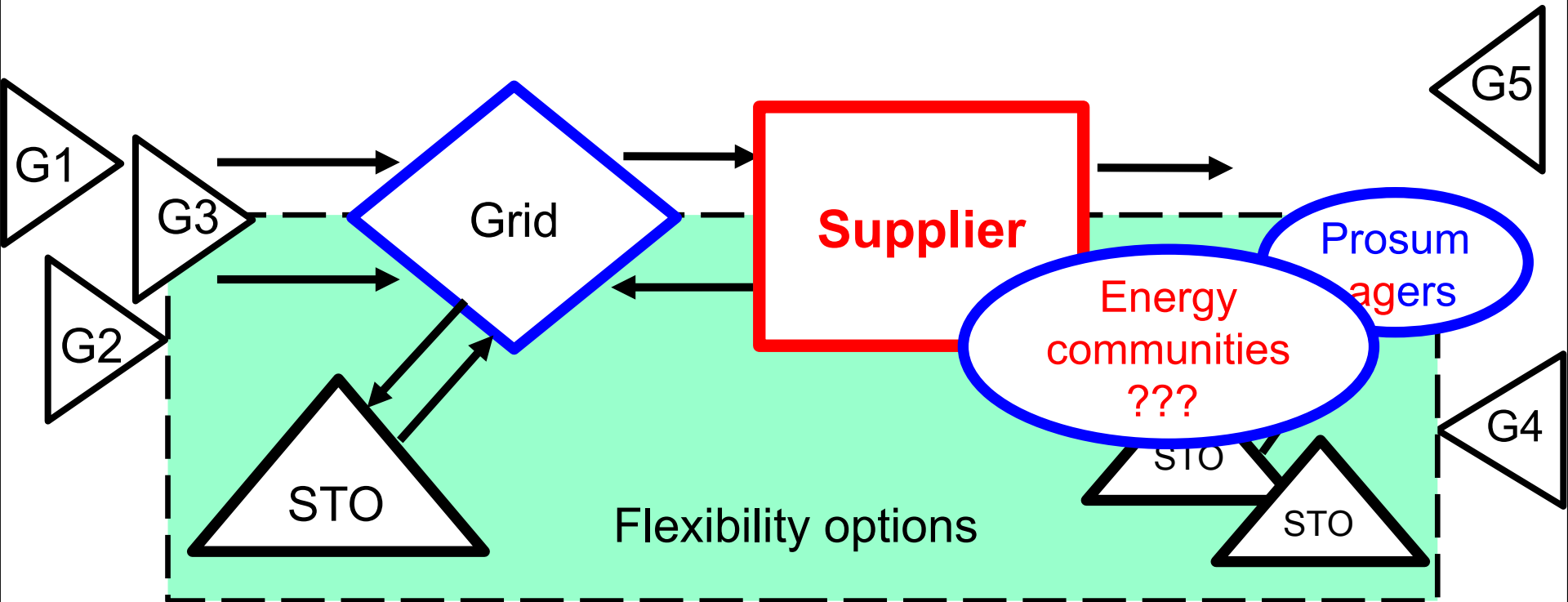
May 27
2018

April 16
2023





New Thinking: Making the electricity system more democratic



- A more **democratic** system allows customers to participate in **supply, storage and DSM**
- most urgent: exhaust **full** creativity for **flexibility** of all market participants (Erdmann)
- Diversification of **back-up** systems for **supply security** ?
- How to **recover the investment costs** of variable renewables if $P=0$?
- **New** market design (s) ?